

Cruise Report

R/V "ALKOR"

Cruise- No. HE-365 (06AK1101)

01 February - 13 February 2011

This report is based on preliminary data !

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1. Cruise No.: AL-365 (06AK10101)

2. Dates of the cruise: from 01/02/2011 to 13/02/2011

3. Particulars of the research vessel:

Name: r/v 'ALKOR'
Nationality: Germany
Operating Authority: Leibniz Institute of Marine Sciences at Kiel University
(IFM - GEOMAR) , 24148 Kiel

4. Geographical area in which ship has operated:

Baltic Sea between Kiel Bight and central Gotland Sea

5. Dates and names of ports of call

02/02/2011 Kiel
04 - 06/02/2011 Saßnitz
08 - 09/02/2011 Slite
11 - 12/02/2011 Saßnitz

6. Purpose of the cruise

Joint cruise for Monitoring in the frame of the COMBINE program of HELCOM and long term observation program of IOW

7. Crew:

Name of master: J.P. Lass
Number of crew: 10

8. Research staff:

Chief scientist: Klaus Nagel

Participants :

01/02 - 13/02/2011	Jan Donath	Ingo Schuffenhauer
	Ines Hand	Erika Trost
	Ursula Hennings	Andrea Tschakste
	Lars Kreuzer	
01/02 – 05/02/2011	Arkadiusz Lis	Sven Trinkler
05/02 - 13/02/2011	Uwe Hehl	David Meyer
	Hildegard Kubsch	Verona Vandieken

9. Co-operating institutions:

All institutions dealing with the COMBINE program of HELCOM

- 10. Scientific equipment :** CTD
water samplers
plankton net

11. General remarks and preliminary results

The cruise AL365 was a joint cruise between the German contribution to the COMBINE program of HELCOM and the long term data series of IOW. The area under investigation covered the Baltic Sea between Kiel Bight and the central Gotland Basin as shown in the attached maps. Marine meteorological, hydrographic, chemical and biological investigations were performed at 49 stations. The measurements were supplemented by continuous registration of standard meteorological parameters as well as surface water temperature and salinity.

For selected stations, which are characteristic for different regions of the Baltic Sea, preliminary data of hydrographic and hydrochemical parameters in the surface and the near-bottom layer are compiled in the attached tables. These results are also compared with mean values calculated from the measurements performed during the February cruises of the years 1993 to 2007.

The weather during the cruise was dominated by some high and low pressure areas passing the area under investigation. Strong pressure gradients caused some heavy storms and several windy days preventing the sampling at some stations (see attached figure). Compared to the last years air temperature was rather moderate varying between 0°C and +4°C during most of the time. Only between 04/02/2011 and 06/20/2011 air temperatures up to +10°C and on 12/02/2011 of -5°C to -2°C had been observed. Although there were a few days with some sunny periods, the sky was clouded almost all the time.

Salinity in the surface layer was within the values expected from long term measurements in all regions of the Baltic Sea and varied between 7 - 8 g/kg except Kiel and Mecklenburg Bight, where 10 - 15 g/kg were measured. A halocline was observed between 40 m and 45 m in the Arkona Basin, between 50 m and 60 m in the Bornholm Basin and in the Eastern Gotland Basin. Salinities found in the bottom layer in the central areas of the Baltic Sea are in the range expected from long term observations and varied around 12. Only salinities in the bottom layer of the Arkona basin are lower than expected (10 - 13 g/kg). No indication for inflow of high saline water from the North Sea had been detected.

The western Baltic Sea and the Arkona basin were well oxygenated down to the sea floor with oxygen concentrations around 7 ml/l to 9 ml/l at most stations. Oxygen concentration in the Bornholm Basin dropped below 2 ml/l at depths exceeding 70 m, but Oxygen is detectable at the bottom layer of all stations in this area. Anoxic conditions had been observed only in the central eastern Gotland Basin at depths below 110 m. In the bottom layer of the eastern Gotland Basin concentrations of up to 5.1 mg/l H₂S were found, which is slightly more the value measured last year at the same time.

Nitrate concentrations in the surface layer were normal for this time of the year and vary between 3 µmol/l and almost 5 µmol/l, which is within the range expected from long term observations. Phosphate concentrations in the surface layer were found between 0.5 µmol/l and 0.8 µmol/l and are in good agreement with the values expected from IOW's long term data series. In the bottom layer concentrations of nitrate and phosphate are controlled by the presence of oxygen or hydrogen sulphide and were found in the expected range. Due to the ongoing stagnation phosphate concentrations at the bottom of the Eastern Gotland Basin were higher than that measured one year ago (>6 µmol/l) and correlate with relatively high amounts of H₂S (>5 mg/l H₂S).

Samples for the determination of trace metals (15 stations), HCH, CKW/PAK (11 stations) and Phyto- and Zooplankton (11 stations) were taken for later analysis in the laboratory.

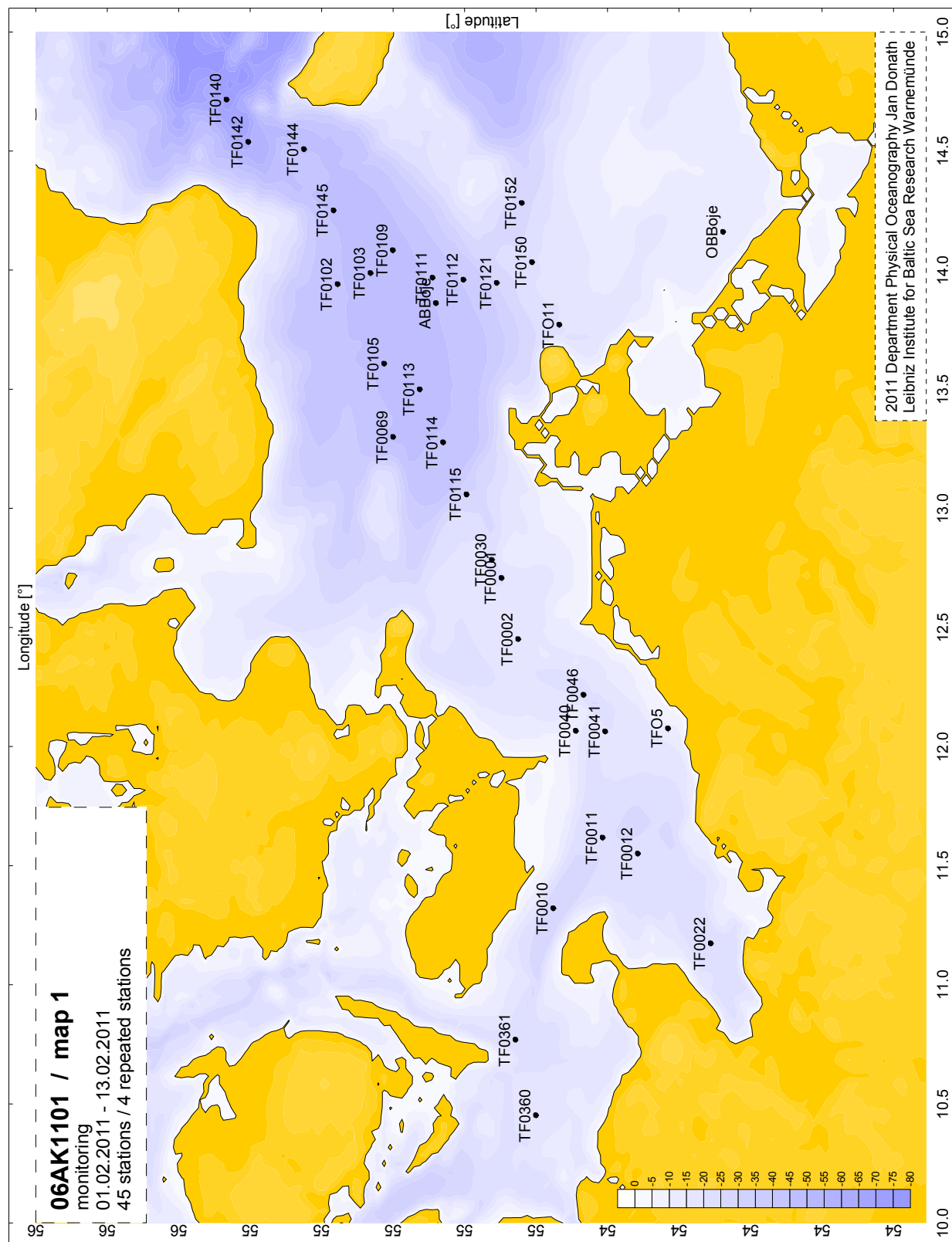
At station TF0271, an automatic analyser fixed to the CTD system is used determine the *in situ* concentration of Fe(II). The method based on a spectrophotometric assay using Ferene as reagent. Two profiles in the range between surface and 200 m were taken, lowering the analyser with a speed of 0.1 m/s. Additional discrete controls were sampled for later analysis in the laboratory.

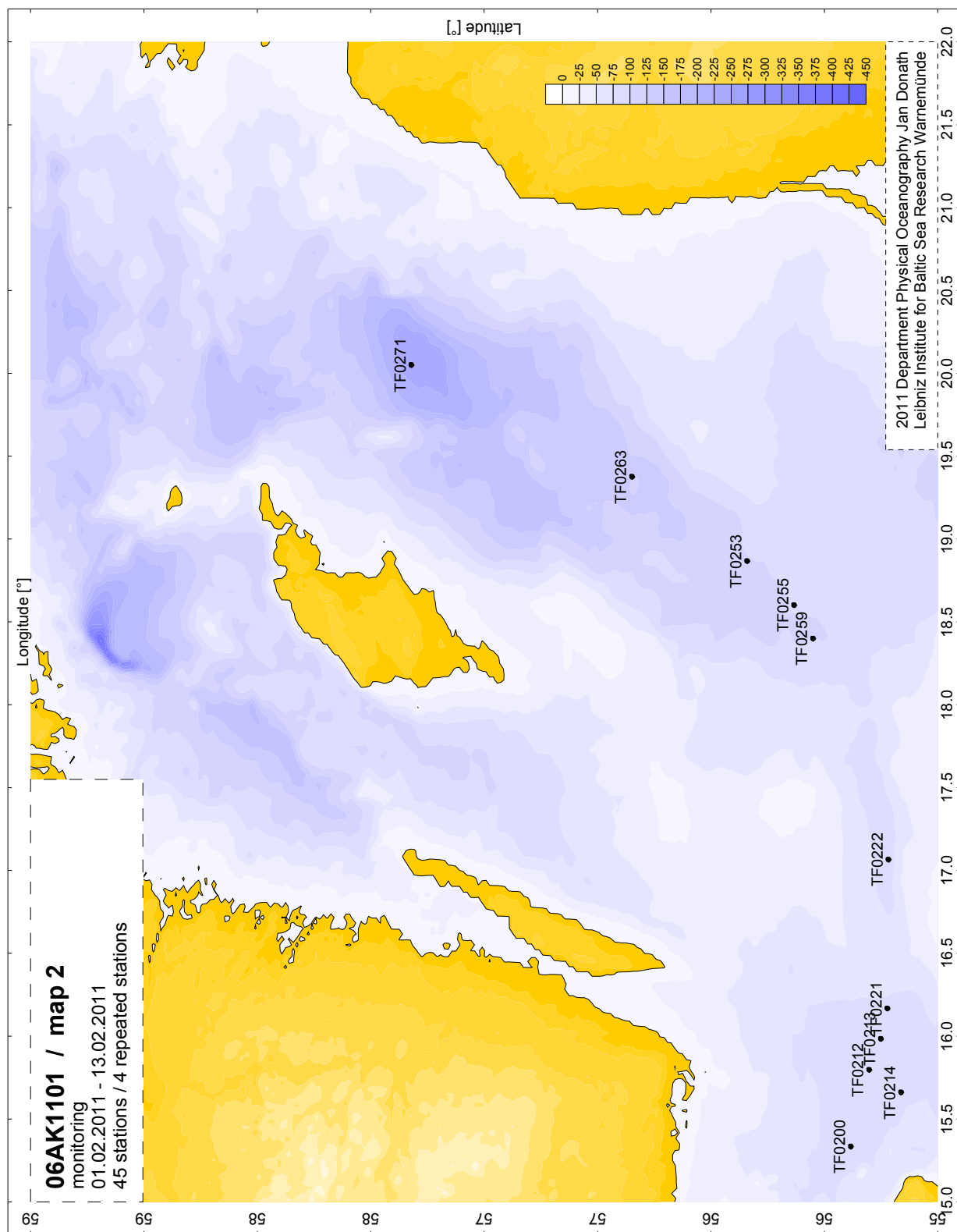
During the cruise a profiling mooring has been recovered at position 57° 19.22' N , 020° 07.96' E

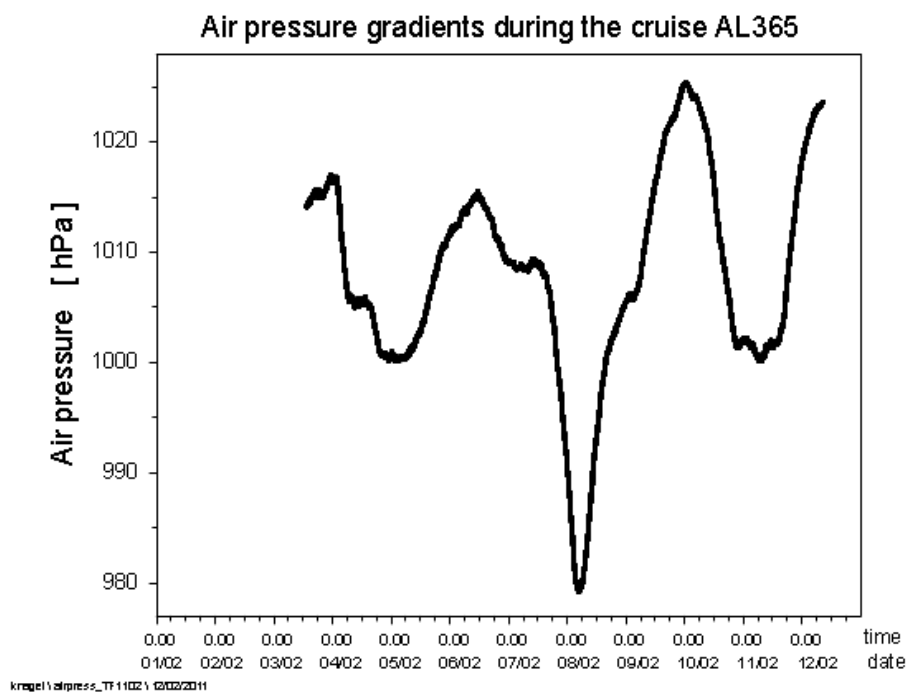
Klaus Nagel
Scientist in charge

Attachments :

- station charts
- figure showing air pressure gradients during the cruise
- tables of preliminary results for selected stations (surface layer and near bottom layer)
- comparison of actual data with mean values calculated from the measurements during the February cruises of the years 1993 – 2007 (surface layer and near bottom layer)
- transect of temperature, salinity and oxygen concentration between Kiel Bight and Gotland Sea
- map showing oxygen concentrations in near the bottom water layer
(hydrogen sulphide concentration is given as negative O₂ equivalents)







Preliminary results of hydrographic and hydrochemical parameters at selected stations

- surface layer -

Station Date	Stat.Name Stat.No. **)	Temp. °C	Salinity	NO ₃ *) µmol/l	PO ₄ µmol/l	SiO ₄ µmol/l	O ₂ ml/l
Kiel Bight 01/02/2011	TF0360 5	0.31	15.29	6.50	0.58	15.2	8.93
Mecklenburg Bight 02/02/2011	TF0012 6	0.19	11.25	5.75	0.54	14.1	9.47
Arkona Basin 03/02/2011	TF0113 16	1.11	7.56	3.29	0.50	12.3	9.37
Bornholm Deep 10/02/2011	TF0213 27	1.98	7.19	3.85	0.53	15.1	8.80
Stolpe Channel 10/02/2011	TF0222 25	1.75	7.19	3.40	0.56	12.4	9.25
SE Gotland Basin 10/02/2011	TF0259 24	1,98	7.27	3.44	0.56	12.7	9.00
Gotland Deep 07/02/2011	TF0271 20	2.02	7.43	3.50	0.57	10.5	9.02
Fårö Deep	TF0286						
Landsort Deep	TF0284						
Karlsö Deep	TF0245						

*) NO₃ is given as sum of NO₃⁻ and NO₂⁻ (in most samples NO₂⁻ was present only in traces)

**) see attached maps

Preliminary results of hydrographic and hydrochemical parameters at selected stations

– near bottom layer -

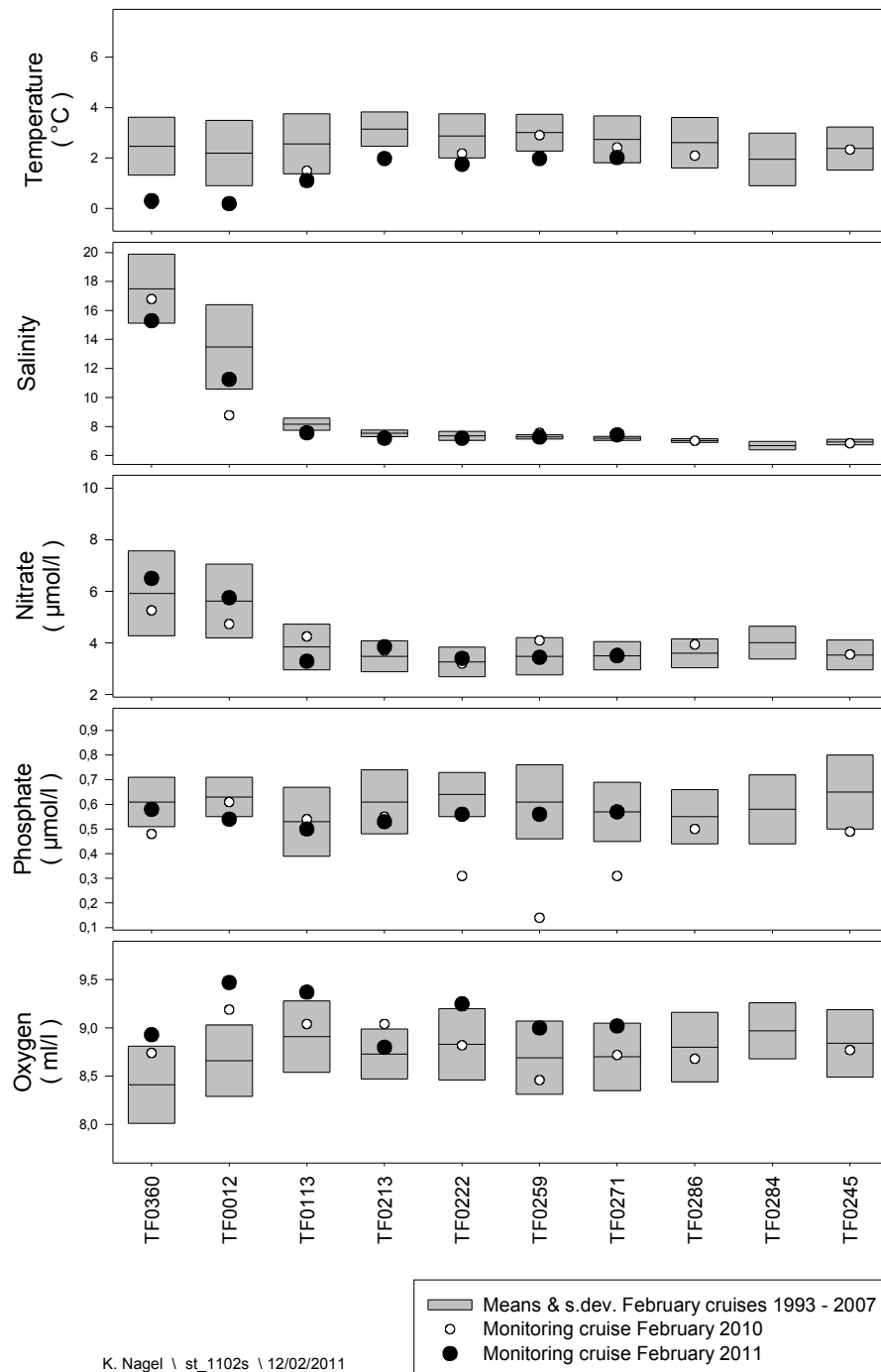
Station Date	Stat.Name Stat.No. **)	Depth m	Temp. °C	Salinity PSU	NO ₃ *) μmol/l	PO ₄ μmol/l	SiO ₄ μmol/l	O ₂ ml/l
Kiel Bight 01/02/2011	TF0360 5	17	1.16	16.50	5.87	0.58	15.3	8.97
Mecklenburg Bight 02/02/2011	TF0012 6	23	2.28	19.12	6.37	0.78	18.4	7.88
Arkona Basin 03/02/2011	TF0113 16	45	2.29	12.09	8.67	0.89	24.5	6.70
Bornholm Deep 10/02/2011	TF0213 27	87	7.64	15.39	7.46	1.97	59.5	0.13
Stolpe Channel 10/02/2011	TF0222 25	89	6.83	11.70	7.76	1.62	36.3	3.36
SE Gotland Basin 10/02/2011	TF0259 24	85	6.36	11.15	7.07	2.13	43.9	1.65
Gotland Deep 07/02/2011	TF0271 20	234	6.44	12.34	-	6.60	79.3	-6.81 (H ₂ S)
Fårö Deep	TF0286							
Landsort Deep	TF0284							
Karlsö Deep	TF0245							

*) NO₃ is given as sum of NO₃⁻ and NO₂⁻ (in most samples NO₂⁻ was present only in traces)

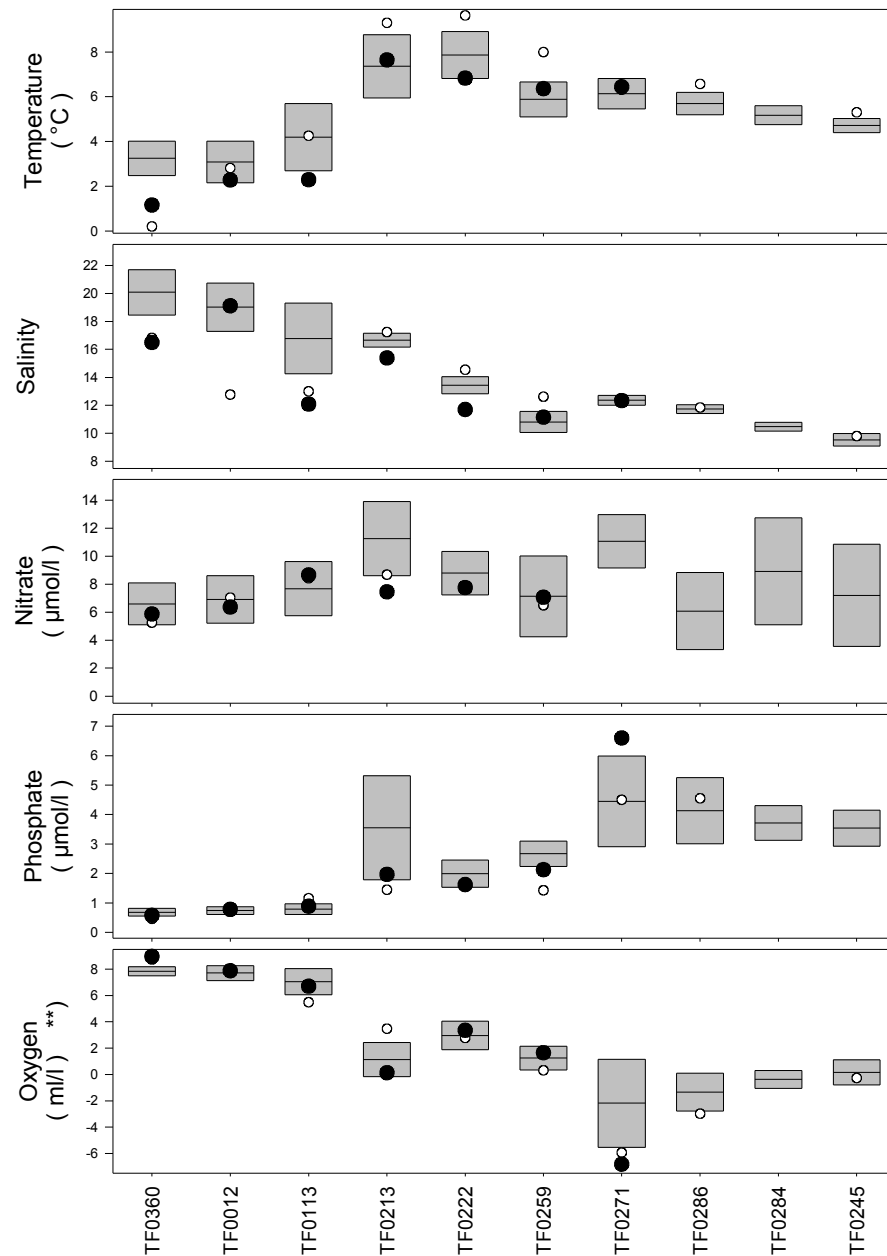
**) see attached maps

H₂S was converted into negative O₂ equivalents

Selected stations / February cruises : near-surface layer



Selected stations / February cruises : near-bottom layer



**) : H₂S was converted to
negative O₂ equivalents

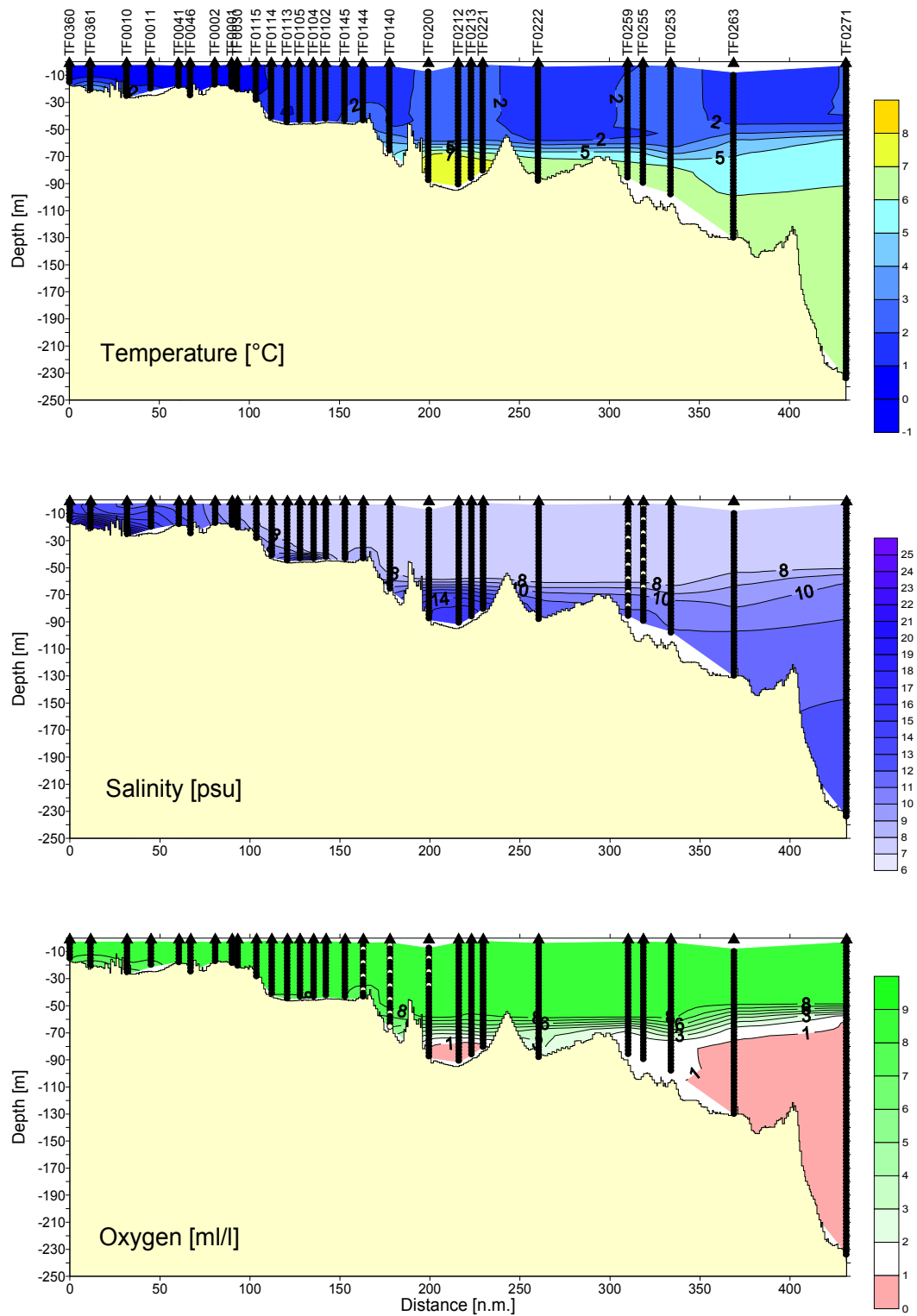
K. Nagel \ st_1102b \ 12/02/2011

Means & s.dev. February cruises 1993 - 2007
○ Monitoring cruise February 2010
● Monitoring cruise February 2011

06AK1101

Kiel Bight - Gotland Sea

01.02.2011 13:06 - 12.02.2011 15:09 UTC



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